



PRO DIRECTIONAL



Marathon Oil Corporation

Madera 19 WXY Fed Com No. 6H
Lea County, NM

January 25, 2019

Job No. LNM1413218
API No. 30-025-44902

HOBBS OCD
DEC 23 2019
RECEIVED

Survey Completion Report



PRODIRECTIONAL

Survey Certification Letter

January 25, 2019



Marathon Oil[®]
Corporation

Operator Name: Marathon Oil
Well Name: Madera 19 WXY Fed Com No. 6H
County/Parish: Lea County,
State: NM
Rig Name: H&P 480
Job Number: LNM1413218

This is to certify the surveys performed on the referenced well by Professional Directional Ent., Inc. are true and correct MWD Surveys, data provided as follows:

<u>Surveyor</u>	<u>Surveyed Depths</u>	<u>Projection to Bit</u>	<u>Dates Performed</u>	<u>Type of Survey</u>
ProDirectional	180' MD – 20,112' MD	20,166' MD	11/02/18 – 12/29/18	MWD

Sincerely,

Mike Coats

Mike Coats
Regulatory Specialist
Professional Directional

850 Conroe Park West Drive | Conroe, TX 77303 | Phone: 936.441.7266

prodirectional.com

The Standard of Excellence in Directional Supervision



Marathon Oil

Marathon Oil

Lea County, NM

Madera 19 WXY Fed Com

No. 6H

OH

Survey: ProDirectional

Survey Report

25 January, 2019





ProDirectional Survey Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well No. 6H
Project:	Lea County, NM(NAD 83)	TVD Reference:	Well @ 3211.50usft
Site:	Madera 19 WXY Fed Com	MD Reference:	Well @ 3211.50usft
Well:	No. 6H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	MWD-180'-20112', Proj. 20166' MD	Database:	WellPlanner1

Project	Lea County, NM(NAD 83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Madera 19 WXY Fed Com		
Site Position:		Northing:	373,155.99 usft
From:	Map	Easting:	827,337.05 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32.022528
		Longitude:	-103.410511
		Grid Convergence:	0.49 °

Well	No. 6H					
Well Position	+N/-S	0.00 usft	Northing:	373,155.99 usft	Latitude:	32.022528
	+E/-W	0.00 usft	Easting:	827,337.05 usft	Longitude:	-103.410511
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,185.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	11/15/2018	6.65	59.68	47,710.20

Design		MWD-180'-20112', Proj. 20166' MD		
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0.00	0.00	0.00	359.50

Survey Program	Date	1/25/2019		
From	To	Survey (Wellbore)	Tool Name	Description
(usft)	(usft)			
180.00	20,166.00	Survey #1 (OH)	MWD+IFR1	OWSG MWD + IFR1



ProDirectional Survey Report



Company: Marathon Oil
Project: Lea County, NM(NAD 83)
Site: Madera 19 WXY Fed Com
Well: No. 6H
Wellbore: OH
Design: MWD-180'-20112', Proj. 20166' MD

Local Co-ordinate Reference: Well No. 6H
TVD Reference: Well @ 3211.50usft
MD Reference: Well @ 3211.50usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance (usft)	Closure Azimuth (°)	Northing (usft)	Easting (usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	373,155.99	827,337.05
180.00	0.53	227.39	180.00	-0.56	-0.56	-0.61	0.83	227.39	373,155.43	827,336.44
Pro MWD First Survey: 180' MD										
241.00	0.54	217.54	240.99	-0.97	-0.98	-1.00	1.40	225.38	373,155.01	827,336.05
333.00	0.52	219.96	332.99	-1.63	-1.65	-1.53	2.25	222.86	373,154.34	827,335.52
424.00	0.33	195.93	423.99	-2.20	-2.21	-1.86	2.90	220.10	373,153.78	827,335.19
515.00	0.31	167.54	514.99	-2.69	-2.71	-1.88	3.30	214.83	373,153.28	827,335.17
607.00	0.30	170.29	606.99	-3.17	-3.19	-1.79	3.66	209.31	373,152.80	827,335.26
698.00	0.33	170.72	697.98	-3.67	-3.68	-1.71	4.06	204.88	373,152.31	827,335.34
789.00	0.29	170.72	788.98	-4.15	-4.17	-1.63	4.47	201.34	373,151.82	827,335.42
880.00	0.23	148.52	879.98	-4.54	-4.55	-1.50	4.79	198.19	373,151.44	827,335.55
972.00	0.25	137.49	971.98	-4.84	-4.86	-1.26	5.02	194.58	373,151.13	827,335.79
1,063.00	0.26	143.11	1,062.98	-5.16	-5.17	-1.00	5.26	191.01	373,150.82	827,336.05
1,087.00	0.20	163.71	1,086.98	-5.24	-5.25	-0.96	5.34	190.37	373,150.74	827,336.09
1,184.00	0.08	197.20	1,183.98	-5.47	-5.48	-0.93	5.56	189.67	373,150.51	827,336.12
1,245.00	0.13	187.46	1,244.98	-5.58	-5.59	-0.95	5.67	189.70	373,150.40	827,336.10
1,337.00	0.28	151.90	1,336.98	-5.88	-5.89	-0.86	5.95	188.33	373,150.10	827,336.19
1,431.00	0.27	170.97	1,430.98	-6.30	-6.31	-0.72	6.35	186.50	373,149.68	827,336.33
1,526.00	0.18	178.52	1,525.98	-6.67	-6.68	-0.68	6.72	185.81	373,149.31	827,336.37
1,620.00	0.30	193.95	1,619.98	-7.06	-7.07	-0.74	7.11	185.94	373,148.92	827,336.31
1,715.00	0.33	191.71	1,714.98	-7.57	-7.58	-0.85	7.62	186.41	373,148.41	827,336.20
1,809.00	0.44	186.14	1,808.97	-8.19	-8.20	-0.94	8.25	186.57	373,147.79	827,336.11
1,904.00	0.38	172.75	1,903.97	-8.87	-8.88	-0.94	8.93	186.07	373,147.11	827,336.11
1,998.00	0.45	153.68	1,997.97	-9.51	-9.52	-0.74	9.54	184.45	373,146.47	827,336.31
2,093.00	0.47	133.91	2,092.97	-10.12	-10.12	-0.30	10.12	181.67	373,145.87	827,336.75
2,187.00	0.50	117.97	2,186.96	-10.58	-10.58	0.34	10.59	178.13	373,145.41	827,337.39
2,282.00	0.58	95.79	2,281.96	-10.83	-10.82	1.19	10.89	173.73	373,145.17	827,338.24

Company: Marathon Oil
Project: Lea County, NM(NAD 83)
Site: Madera 19 WXY Fed Com
Well: No. 6H
Wellbore: OH
Design: MWD-180'-20112', Proj. 20166' MD

Local Co-ordinate Reference: Well No. 6H
TVD Reference: Well @ 3211.50usft
MD Reference: Well @ 3211.50usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance (usft)	Closure Azimuth (°)	Northing (usft)	Easting (usft)
2,376.00	0.68	87.21	2,375.95	-10.86	-10.84	2.22	11.07	168.43	373,145.15	827,339.27
2,470.00	0.74	80.85	2,469.94	-10.75	-10.72	3.38	11.24	162.52	373,145.27	827,340.43
2,565.00	0.45	108.40	2,564.94	-10.78	-10.74	4.34	11.58	158.02	373,145.25	827,341.39
2,659.00	1.11	181.80	2,658.93	-11.81	-11.77	4.66	12.65	158.40	373,144.22	827,341.71
2,754.00	2.92	194.79	2,753.87	-15.06	-15.03	4.01	15.55	165.05	373,140.96	827,341.06
2,848.00	5.34	197.64	2,847.62	-21.53	-21.51	2.07	21.61	174.49	373,134.48	827,339.12
2,942.00	7.67	201.68	2,941.01	-31.49	-31.51	-1.57	31.55	182.85	373,124.48	827,335.48
3,037.00	10.05	208.81	3,034.87	-44.60	-44.67	-7.91	45.36	190.04	373,111.32	827,329.14
3,131.00	10.71	211.91	3,127.33	-59.12	-59.27	-16.48	61.52	195.54	373,096.72	827,320.57
3,226.00	10.12	211.02	3,220.77	-73.69	-73.91	-25.44	78.17	199.00	373,082.08	827,311.61
3,320.00	9.75	210.04	3,313.36	-87.58	-87.88	-33.68	94.12	200.97	373,068.11	827,303.37
3,414.00	10.44	220.03	3,405.91	-100.91	-101.29	-43.15	110.10	203.07	373,054.70	827,293.90
3,509.00	10.17	221.46	3,499.38	-113.69	-114.17	-54.24	126.40	205.41	373,041.82	827,282.81
3,603.00	9.51	222.32	3,591.99	-125.56	-126.13	-64.96	141.88	207.25	373,029.86	827,272.09
3,698.00	9.03	223.43	3,685.75	-136.69	-137.35	-75.37	156.67	208.76	373,018.64	827,261.68
3,792.00	8.88	224.71	3,778.61	-147.11	-147.86	-85.54	170.82	210.05	373,008.13	827,251.51
3,887.00	8.80	217.54	3,872.48	-158.00	-158.83	-95.13	185.14	210.92	372,997.16	827,241.92
3,981.00	8.96	216.17	3,965.35	-169.53	-170.45	-103.83	199.58	211.35	372,985.54	827,233.22
4,076.00	7.81	218.88	4,059.34	-180.46	-181.44	-112.25	213.36	211.74	372,974.55	827,224.80
4,170.00	7.00	215.12	4,152.55	-190.05	-191.10	-119.55	225.42	212.03	372,964.89	827,217.50
4,264.00	7.40	211.12	4,245.81	-199.86	-200.97	-125.98	237.19	212.08	372,955.02	827,211.07
4,359.00	6.55	211.90	4,340.11	-209.64	-210.80	-132.00	248.72	212.05	372,945.19	827,205.05
4,453.00	5.96	212.49	4,433.55	-218.26	-219.47	-137.46	258.97	212.06	372,936.52	827,199.59
4,547.00	5.45	212.80	4,527.08	-226.09	-227.34	-142.50	268.31	212.08	372,928.65	827,194.55
4,642.00	4.55	208.13	4,621.72	-233.17	-234.46	-146.72	276.58	212.04	372,921.53	827,190.33
4,736.00	3.82	200.30	4,715.47	-239.37	-240.68	-149.56	283.37	211.86	372,915.31	827,187.49
4,831.00	3.42	198.86	4,810.28	-245.00	-246.33	-151.58	289.23	211.61	372,909.66	827,185.47

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Local Co-ordinate Reference: Well No. 6H
TVD Reference: Well @ 3211.50usft
MD Reference: Well @ 3211.50usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance (usft)	Closure Azimuth (°)	Northing (usft)	Easting (usft)
4,925.00	2.92	186.57	4,904.14	-250.02	-251.36	-152.76	294.14	211.29	372,904.63	827,184.29
5,020.00	2.68	177.57	4,999.02	-254.64	-255.99	-152.94	298.19	210.86	372,900.00	827,184.11
5,114.00	2.45	177.69	5,092.93	-258.85	-260.19	-152.76	301.72	210.42	372,895.80	827,184.29
5,209.00	2.21	180.22	5,187.85	-262.71	-264.05	-152.69	305.02	210.04	372,891.94	827,184.36
5,303.00	2.20	182.04	5,281.78	-266.32	-267.67	-152.76	308.19	209.71	372,888.32	827,184.29
5,363.00	2.03	182.79	5,341.74	-268.53	-269.88	-152.85	310.16	209.53	372,886.11	827,184.20
5,484.00	2.33	183.44	5,462.65	-273.13	-274.47	-153.11	314.29	209.15	372,881.52	827,183.94
5,578.00	2.82	205.97	5,556.56	-277.10	-278.46	-154.23	318.32	208.98	372,877.53	827,182.82
5,673.00	3.47	229.45	5,651.42	-281.05	-282.43	-157.44	323.35	209.14	372,873.56	827,179.61
5,767.00	4.07	237.24	5,745.22	-284.66	-286.08	-162.41	328.97	209.58	372,869.91	827,174.84
5,862.00	5.80	245.54	5,839.86	-288.41	-289.90	-169.61	335.87	210.33	372,866.09	827,167.44
5,956.00	6.16	248.39	5,933.35	-292.15	-293.72	-178.63	343.77	211.31	372,862.27	827,158.42
6,051.00	6.15	248.13	6,027.80	-295.84	-297.49	-188.09	351.96	212.30	372,858.50	827,148.96
6,145.00	6.18	249.32	6,121.26	-299.42	-301.16	-197.49	360.14	213.26	372,854.83	827,139.56
6,239.00	4.54	255.97	6,214.85	-302.04	-303.84	-205.84	367.00	214.12	372,852.15	827,131.21
6,334.00	3.40	286.47	6,309.63	-302.09	-303.96	-212.19	370.69	214.92	372,852.03	827,124.86
6,428.00	2.65	293.78	6,403.50	-300.39	-302.29	-216.85	372.03	215.65	372,853.70	827,120.20
6,522.00	1.72	279.86	6,497.43	-299.24	-301.17	-220.23	373.10	216.18	372,854.82	827,116.82
6,617.00	1.75	261.12	6,592.38	-299.19	-301.15	-223.06	374.77	216.53	372,854.84	827,113.99
6,711.00	1.63	269.82	6,686.34	-299.40	-301.38	-225.82	376.59	216.84	372,854.61	827,111.23
6,806.00	0.45	214.59	6,781.33	-299.69	-301.69	-227.38	377.78	217.01	372,854.30	827,109.67
6,900.00	0.37	210.72	6,875.33	-300.26	-302.25	-227.75	378.45	217.00	372,853.74	827,109.30
6,994.00	0.58	193.38	6,969.32	-300.98	-302.98	-228.01	379.19	216.96	372,853.01	827,109.04
7,089.00	0.57	179.15	7,064.32	-301.92	-303.92	-228.12	380.01	216.89	372,852.07	827,108.93
7,183.00	0.52	211.37	7,158.31	-302.75	-304.75	-228.33	380.80	216.84	372,851.24	827,108.72
7,278.00	0.51	193.77	7,253.31	-303.52	-305.53	-228.66	381.62	216.81	372,850.46	827,108.39
7,372.00	0.55	176.40	7,347.31	-304.38	-306.39	-228.73	382.35	216.74	372,849.60	827,108.32

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7,467.00	0.84	164.53	7,442.30	-305.51	-307.51	-228.51	383.12	216.62	372,848.48	827,108.54
7,561.00	0.77	174.28	7,536.29	-306.80	-308.80	-228.27	384.01	216.47	372,847.19	827,108.78
7,655.00	0.78	199.14	7,630.28	-308.03	-310.04	-228.41	385.09	216.38	372,845.95	827,108.64
7,750.00	1.03	187.19	7,725.27	-309.49	-311.50	-228.73	386.46	216.29	372,844.49	827,108.32
7,844.00	1.23	206.23	7,819.25	-311.23	-313.24	-229.28	388.19	216.20	372,842.75	827,107.77
7,938.00	1.09	205.63	7,913.23	-312.93	-314.95	-230.12	390.06	216.15	372,841.04	827,106.93
8,033.00	1.46	194.42	8,008.21	-314.91	-316.94	-230.81	392.07	216.06	372,839.05	827,106.24
8,127.00	0.69	212.82	8,102.19	-316.54	-318.57	-231.41	393.75	216.00	372,837.42	827,105.64
8,222.00	0.54	225.87	8,197.19	-317.33	-319.36	-232.05	394.76	216.00	372,836.63	827,105.00
8,316.00	0.43	5.72	8,291.18	-317.28	-319.32	-232.33	394.90	216.04	372,836.87	827,104.72
8,410.00	0.67	64.47	8,385.18	-316.70	-318.73	-231.80	394.11	216.03	372,837.26	827,105.25
8,505.00	0.90	80.16	8,480.17	-316.34	-318.37	-230.56	393.09	215.91	372,837.62	827,106.49
8,599.00	1.11	71.52	8,574.16	-315.94	-317.95	-228.97	391.82	215.76	372,838.04	827,108.08
8,694.00	0.98	69.21	8,669.14	-315.38	-317.37	-227.34	390.39	215.61	372,838.62	827,109.71
8,788.00	0.91	82.89	8,763.13	-315.01	-316.99	-225.85	389.22	215.47	372,839.00	827,111.20
8,883.00	0.94	70.30	8,858.12	-314.67	-316.64	-224.36	388.07	215.32	372,839.35	827,112.69
8,977.00	0.90	58.35	8,952.10	-314.03	-315.99	-223.01	386.76	215.21	372,840.00	827,114.04
9,071.00	0.80	56.27	9,046.09	-313.29	-315.24	-221.84	385.47	215.13	372,840.75	827,115.21
9,166.00	0.58	47.73	9,141.09	-312.61	-314.55	-220.93	384.38	215.08	372,841.44	827,116.12
9,260.00	0.70	54.15	9,235.08	-311.96	-313.89	-220.11	383.38	215.04	372,842.10	827,116.94
9,354.00	0.81	33.80	9,329.07	-311.08	-313.00	-219.28	382.17	215.01	372,842.99	827,117.77
9,449.00	1.37	32.18	9,424.06	-309.57	-311.48	-218.30	380.36	215.02	372,844.51	827,118.75
9,543.00	1.72	8.46	9,518.02	-307.23	-309.14	-217.49	377.98	215.13	372,846.85	827,119.56
9,637.00	1.68	0.03	9,611.98	-304.46	-306.36	-217.28	375.59	215.35	372,849.63	827,119.77
9,731.00	1.26	67.85	9,705.96	-302.70	-304.60	-216.32	373.60	215.38	372,851.39	827,120.73
9,826.00	1.51	126.22	9,800.93	-303.06	-304.94	-214.35	372.74	215.10	372,851.05	827,122.70
9,920.00	1.69	162.42	9,894.90	-305.13	-307.00	-212.93	373.61	214.74	372,848.99	827,124.12

Company: Marathon Oil
Project: Lea County, NM(NAD 83)
Site: Madera 19 WXY Fed Com
Well: No. 6H
Wellbore: OH
Design: MWD-180°-20112', Proj. 20166' MD

Local Co-ordinate Reference: Well No. 6H
TVD Reference: Well @ 3211.50usft
MD Reference: Well @ 3211.50usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance (usft)	Closure Azimuth (°)	Northing (usft)	Easting (usft)
10,015.00	1.73	173.01	9,989.86	-307.89	-309.75	-212.33	375.54	214.43	372,846.24	827,124.72
10,109.00	1.60	174.55	10,083.82	-310.61	-312.47	-212.03	377.62	214.16	372,843.52	827,125.02
10,204.00	1.54	181.71	10,178.78	-313.20	-315.07	-211.95	379.72	213.93	372,840.92	827,125.10
10,298.00	1.13	197.90	10,272.76	-315.35	-317.21	-212.27	381.68	213.79	372,838.78	827,124.78
10,393.00	0.93	212.03	10,367.74	-316.88	-318.76	-212.97	383.35	213.75	372,837.23	827,124.08
10,487.00	0.52	218.47	10,461.73	-317.86	-319.74	-213.64	384.54	213.75	372,836.25	827,123.41
10,582.00	0.75	275.47	10,556.73	-318.13	-320.01	-214.52	385.27	213.84	372,835.98	827,122.53
10,676.00	0.36	259.70	10,650.72	-318.12	-320.01	-215.43	385.76	213.95	372,835.98	827,121.62
10,771.00	0.15	85.74	10,745.72	-318.16	-320.05	-215.60	385.90	213.97	372,835.94	827,121.45
10,865.00	0.62	67.07	10,839.72	-317.96	-319.85	-215.00	385.39	213.91	372,836.14	827,122.05
10,959.00	0.92	51.49	10,933.71	-317.30	-319.18	-213.95	384.25	213.83	372,836.81	827,123.10
11,054.00	1.29	44.80	11,028.69	-316.08	-317.94	-212.60	382.47	213.77	372,838.05	827,124.45
11,148.00	1.38	40.55	11,122.67	-314.48	-316.33	-211.11	380.31	213.72	372,839.66	827,125.94
11,243.00	1.16	57.78	11,217.65	-313.11	-314.95	-209.56	378.30	213.64	372,841.04	827,127.49
11,337.00	1.25	72.73	11,311.63	-312.31	-314.14	-207.77	376.63	213.48	372,841.85	827,129.28
11,432.00	1.21	68.96	11,406.60	-311.66	-313.47	-205.85	375.02	213.29	372,842.52	827,131.20
11,526.00	1.39	45.57	11,500.58	-310.52	-312.32	-204.11	373.10	213.17	372,843.67	827,132.94
11,620.00	1.15	35.71	11,594.56	-308.97	-310.75	-202.74	371.04	213.12	372,845.24	827,134.31
11,715.00	0.85	346.71	11,689.54	-307.52	-309.29	-202.35	369.60	213.19	372,846.70	827,134.70
11,809.00	0.95	318.13	11,783.53	-306.25	-308.03	-203.03	368.92	213.39	372,847.96	827,134.02
11,904.00	0.99	316.57	11,878.52	-305.06	-306.85	-204.12	368.54	213.63	372,849.14	827,132.93
11,921.00	0.98	320.31	11,895.52	-304.84	-306.63	-204.31	368.47	213.68	372,849.36	827,132.74
12,007.00	0.68	334.65	11,981.51	-303.81	-305.61	-205.00	367.99	213.85	372,850.38	827,132.05
12,038.00	0.45	326.71	12,012.51	-303.54	-305.34	-205.14	367.85	213.90	372,850.65	827,131.91
12,133.00	5.42	352.28	12,107.35	-298.77	-300.58	-205.95	364.37	214.42	372,855.41	827,131.10
12,227.00	17.17	349.49	12,199.37	-280.64	-282.47	-209.09	351.44	216.51	372,873.52	827,127.96
12,321.00	28.51	356.09	12,285.87	-244.46	-246.32	-213.17	325.75	220.87	372,909.67	827,123.88



ProDirectional Survey Report



Company: Marathon Oil
Project: Lea County, NM(NAD 83)
Site: Madera 19 WXY Fed Com
Well: No. 6H
Wellbore: OH
Design: MWD-180'-20112', Proj. 20166' MD

Local Co-ordinate Reference: Well No. 6H
TVD Reference: Well @ 3211.50usft
MD Reference: Well @ 3211.50usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance (usft)	Closure Azimuth (°)	Northing (usft)	Easting (usft)
12,416.00	41.44	0.21	12,363.56	-190.15	-192.03	-214.60	287.98	228.18	372,963.96	827,122.45
12,510.00	53.79	359.93	12,426.81	-120.86	-122.73	-214.53	247.16	240.23	373,033.26	827,122.52
12,605.00	57.64	1.01	12,480.31	-42.39	-44.26	-213.87	218.41	258.31	373,111.73	827,123.18
12,700.00	57.84	0.83	12,531.02	37.92	36.07	-212.58	215.62	279.63	373,192.06	827,124.47
12,794.00	62.71	0.05	12,577.61	119.51	117.67	-211.97	242.44	299.04	373,273.66	827,125.08
12,889.00	68.14	0.52	12,617.11	205.87	204.03	-211.53	293.90	313.97	373,360.02	827,125.52
12,984.00	75.40	0.25	12,646.81	296.03	294.20	-210.93	362.00	324.36	373,450.19	827,126.12
13,078.00	82.31	0.23	12,664.97	388.19	386.37	-210.55	440.01	331.41	373,542.36	827,126.50
13,173.00	92.86	3.57	12,668.96	482.88	481.09	-207.39	523.88	336.68	373,637.08	827,129.66
13,267.00	91.85	1.79	12,665.10	576.65	574.90	-203.00	609.69	340.55	373,730.89	827,134.05
13,368.00	90.65	0.32	12,662.90	677.58	675.85	-201.14	705.15	343.43	373,831.84	827,135.91
13,463.00	89.70	358.90	12,662.61	772.58	770.85	-201.79	796.82	345.33	373,926.84	827,135.26
13,557.00	89.18	358.67	12,663.53	866.57	864.82	-203.78	888.51	346.74	374,020.81	827,133.27
13,652.00	88.33	358.38	12,665.59	961.53	959.77	-206.23	981.67	347.87	374,115.76	827,130.82
13,747.00	88.09	358.48	12,668.56	1,056.47	1,054.68	-208.83	1,075.16	348.80	374,210.67	827,128.22
13,841.00	88.13	0.43	12,671.66	1,150.41	1,148.62	-209.72	1,167.61	349.65	374,304.61	827,127.33
13,936.00	90.84	0.93	12,672.51	1,245.38	1,243.60	-208.60	1,260.98	350.48	374,399.59	827,128.45
14,031.00	91.45	1.05	12,670.61	1,340.32	1,338.57	-206.96	1,354.47	351.21	374,494.56	827,130.09
14,125.00	91.07	0.50	12,668.55	1,434.28	1,432.54	-205.68	1,447.23	351.83	374,588.53	827,131.37
14,220.00	91.29	0.85	12,666.59	1,529.24	1,527.51	-204.57	1,541.15	352.37	374,683.50	827,132.48
14,314.00	90.82	1.50	12,664.86	1,623.18	1,621.47	-202.64	1,634.09	352.88	374,777.46	827,134.41
14,409.00	90.32	1.27	12,663.92	1,718.12	1,716.44	-200.34	1,728.09	353.34	374,872.43	827,136.71
14,504.00	90.23	0.90	12,663.46	1,813.09	1,811.42	-198.54	1,822.27	353.74	374,967.41	827,138.51
14,598.00	89.17	359.87	12,663.95	1,907.07	1,905.42	-197.91	1,915.67	354.07	375,061.41	827,139.14
14,693.00	89.64	0.34	12,664.94	2,002.06	2,000.41	-197.74	2,010.16	354.35	375,156.40	827,139.31
14,787.00	89.31	0.26	12,665.80	2,096.05	2,094.41	-197.25	2,103.67	354.62	375,250.40	827,139.80
14,882.00	89.33	0.10	12,666.93	2,191.03	2,189.40	-196.95	2,198.24	354.86	375,345.39	827,140.10

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Wellbore: OH
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Local Co-ordinate Reference: Well No. 6H
TVD Reference: Well @ 3211.50usft
MD Reference: Well @ 3211.50usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance (usft)	Closure Azimuth (°)	Northing (usft)	Easting (usft)
14,976.00	89.05	359.64	12,668.26	2,285.02	2,283.39	-197.16	2,291.89	355.07	375,439.38	827,139.89
15,071.00	89.77	359.29	12,669.23	2,380.02	2,378.38	-198.05	2,386.61	355.24	375,534.37	827,139.00
15,165.00	90.11	359.27	12,669.33	2,474.02	2,472.37	-199.23	2,480.39	355.39	375,628.36	827,137.82
15,260.00	90.93	359.06	12,668.47	2,569.01	2,567.36	-200.61	2,575.18	355.53	375,723.35	827,136.44
15,354.00	91.50	358.97	12,666.48	2,662.98	2,661.32	-202.23	2,668.99	355.65	375,817.31	827,134.82
15,449.00	92.29	359.48	12,663.34	2,757.93	2,756.26	-203.51	2,763.76	355.78	375,912.25	827,133.54
15,544.00	89.95	359.13	12,661.48	2,852.91	2,851.23	-204.66	2,858.56	355.89	376,007.22	827,132.39
15,638.00	90.45	359.28	12,661.15	2,946.90	2,945.22	-205.97	2,952.41	356.00	376,101.21	827,131.08
15,732.00	89.20	0.49	12,661.44	3,040.90	3,039.21	-206.16	3,046.20	356.12	376,195.20	827,130.89
15,827.00	88.82	0.25	12,663.08	3,135.87	3,134.20	-205.54	3,140.93	356.25	376,290.19	827,131.51
15,921.00	88.52	359.28	12,665.26	3,229.84	3,228.17	-205.93	3,234.73	356.35	376,384.16	827,131.12
16,016.00	88.05	359.80	12,668.10	3,324.80	3,323.12	-206.69	3,329.55	356.44	376,479.11	827,130.36
16,111.00	88.25	359.35	12,671.17	3,419.75	3,418.07	-207.40	3,424.36	356.53	376,574.06	827,129.65
16,205.00	87.39	359.30	12,674.75	3,513.68	3,512.00	-208.50	3,518.18	356.60	376,667.99	827,128.55
16,300.00	90.00	357.88	12,676.91	3,608.63	3,606.93	-210.84	3,613.09	356.65	376,762.92	827,126.21
16,394.00	90.45	357.95	12,676.54	3,702.60	3,700.87	-214.26	3,707.07	356.69	376,856.86	827,122.79
16,489.00	94.11	359.54	12,672.76	3,797.49	3,795.75	-216.34	3,801.91	356.74	376,951.74	827,120.71
16,583.00	94.55	359.86	12,665.66	3,891.23	3,889.48	-216.83	3,895.52	356.81	377,045.47	827,120.22
16,677.00	94.37	359.58	12,658.36	3,984.94	3,983.20	-217.29	3,989.12	356.88	377,139.19	827,119.76
16,772.00	95.50	359.65	12,650.18	4,079.59	4,077.84	-217.93	4,083.66	356.94	377,233.83	827,119.12
16,866.00	93.00	359.69	12,643.22	4,173.32	4,171.57	-218.47	4,177.29	357.00	377,327.56	827,118.58
16,961.00	92.09	359.26	12,639.00	4,268.22	4,266.47	-219.33	4,272.11	357.06	377,422.46	827,117.72
17,055.00	92.67	358.71	12,635.10	4,362.14	4,360.38	-221.00	4,365.97	357.10	377,516.37	827,116.05
17,150.00	92.15	358.03	12,631.10	4,457.04	4,455.25	-223.70	4,460.87	357.13	377,611.24	827,113.35
17,245.00	92.59	357.71	12,627.17	4,551.92	4,550.11	-227.23	4,555.78	357.14	377,706.10	827,109.82
17,339.00	92.68	357.23	12,622.85	4,645.76	4,643.91	-231.37	4,649.67	357.15	377,799.90	827,105.68
17,434.00	90.20	357.98	12,620.46	4,740.67	4,738.79	-235.34	4,744.63	357.16	377,894.78	827,101.71



ProDirectional Survey Report



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Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance (usft)	Closure Azimuth (°)	Northing (usft)	Easting (usft)
17,528.00	90.21	357.47	12,620.13	4,834.62	4,832.72	-239.07	4,838.63	357.17	377,988.71	827,097.98
17,623.00	90.86	359.31	12,619.24	4,929.59	4,927.67	-241.74	4,933.60	357.19	378,083.66	827,095.31
17,717.00	90.74	357.62	12,617.93	5,023.57	5,021.63	-244.26	5,027.56	357.22	378,177.62	827,092.79
17,812.00	91.50	1.61	12,616.07	5,118.53	5,116.59	-244.90	5,122.44	357.26	378,272.58	827,092.15
17,907.00	92.95	2.32	12,612.38	5,213.37	5,211.46	-241.64	5,217.05	357.35	378,367.45	827,095.41
18,001.00	90.67	2.86	12,609.41	5,307.18	5,305.31	-237.40	5,310.61	357.44	378,461.30	827,099.65
18,096.00	89.18	1.62	12,609.54	5,402.06	5,400.23	-233.68	5,405.28	357.52	378,556.22	827,103.37
18,190.00	89.38	2.13	12,610.72	5,495.97	5,494.17	-230.61	5,499.01	357.60	378,650.16	827,106.44
18,284.00	88.79	359.62	12,612.22	5,589.93	5,588.14	-229.17	5,592.84	357.65	378,744.13	827,107.88
18,379.00	89.04	0.57	12,614.02	5,684.90	5,683.12	-229.01	5,687.73	357.69	378,839.11	827,108.04
18,473.00	89.36	0.88	12,615.33	5,778.87	5,777.10	-227.83	5,781.60	357.74	378,933.09	827,109.22
18,567.00	89.56	1.07	12,616.22	5,872.84	5,871.09	-226.23	5,875.44	357.79	379,027.08	827,110.82
18,662.00	89.46	1.09	12,617.03	5,967.80	5,966.07	-224.44	5,970.29	357.85	379,122.06	827,112.61
18,757.00	89.95	1.09	12,617.52	6,062.76	6,061.05	-222.63	6,065.13	357.90	379,217.04	827,114.42
18,851.00	91.66	0.43	12,616.20	6,156.72	6,155.03	-221.38	6,159.01	357.94	379,311.02	827,115.67
18,945.00	92.36	0.71	12,612.90	6,250.65	6,248.96	-220.45	6,252.85	357.98	379,404.95	827,116.60
19,040.00	92.15	359.82	12,609.16	6,345.57	6,343.89	-220.01	6,347.70	358.01	379,499.88	827,117.04
19,135.00	90.57	359.34	12,606.91	6,440.54	6,438.85	-220.70	6,442.64	358.04	379,594.84	827,116.35
19,229.00	91.08	359.18	12,605.55	6,534.52	6,532.84	-221.92	6,536.60	358.05	379,688.83	827,115.13
19,324.00	91.46	358.97	12,603.45	6,629.50	6,627.80	-223.45	6,631.57	358.07	379,783.79	827,113.60
19,418.00	92.62	358.75	12,600.10	6,723.43	6,721.72	-225.32	6,725.50	358.08	379,877.71	827,111.73
19,512.00	91.71	357.91	12,596.55	6,817.34	6,815.61	-228.06	6,819.43	358.08	379,971.60	827,108.99
19,606.00	92.26	358.73	12,593.30	6,911.27	6,909.51	-230.81	6,913.37	358.09	380,065.50	827,106.24
19,700.00	89.43	356.84	12,591.91	7,005.20	7,003.42	-234.44	7,007.34	358.08	380,159.41	827,102.61
19,794.00	89.59	356.82	12,592.71	7,099.09	7,097.27	-239.64	7,101.32	358.07	380,253.26	827,097.41
19,889.00	89.66	357.64	12,593.34	7,194.02	7,192.16	-244.23	7,196.30	358.06	380,348.15	827,092.82
19,983.00	88.68	357.18	12,594.70	7,287.94	7,286.05	-248.48	7,290.29	358.05	380,442.04	827,088.57

Company: Marathon Oil
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Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance (usft)	Closure Azimuth (°)	Northing (usft)	Easting (usft)
20,077.00	88.70	356.35	12,596.85	7,381.81	7,379.88	-253.78	7,384.24	358.03	380,535.87	827,083.27
20,112.00	88.60	356.24	12,597.67	7,416.75	7,414.79	-256.04	7,419.21	358.02	380,570.78	827,081.01
Last Survey: 20112' MD										
20,166.00	88.60	356.24	12,598.99	7,470.64	7,468.66	-259.58	7,473.17	358.01	380,624.65	827,077.47
PTB: 20166' MD										

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
180.00	180.00	-0.56	-0.61	Pro MWD First Survey: 180' MD
20,112.00	12,597.67	7,414.79	-256.04	Last Survey: 20112' MD
20,166.00	12,598.99	7,468.66	-259.58	PTB: 20166' MD